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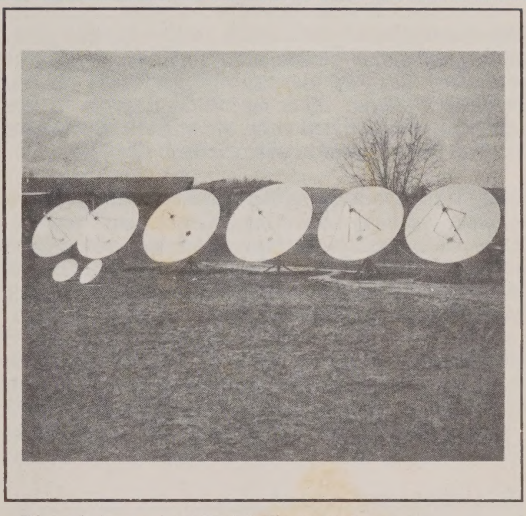
Satellite Newsflash: The Americas

Multiple Parabolic Antenna Array Demonstrated in Washington, D.C.

At the Intelsat Micro Terminal Exhibition and Conference held in Washington, D.C. from May 11 to May 14, DH Satellite and Anderson Scientific jointly demonstrated a phased array that employed multiple parabolic antennas for the reception of a single geostationary satellite. Using matched 3-foot spun aluminum dishes, matched C-band LNAs, a 4-GHz combiner and and an active phaser, Anderson Scientific was able to show that arrays of two or more small antennas could be used to replace a single large one. The technology is based on the design of large radio astronomy telescopes which employ multiple parabolas to gather weak signals generated by distant galaxies. The existence of large radio astronomy arrays was popularized in science fiction novels like Arthur C. Clarke's "Imperial Earth" and, more recently, in Carl Sagan's book "Contact."

Inside This Issue:

Multiple Parabolic Array Debuts	p. 1
Satcom K1~K2 Problems Revealed	p. 2
BTI Begins Satellite Data Trials	p. 3
New Intelsat VA F11 TV Services	p. 3
Satellite TV in Norway	p. 4
RTM Earth Station Tender	p. 4
Palapa B2P Developments	p. 4
CNN in Asia	p. 5
Clarke Center Plans Seminar	p. 6
Worldnet in Asia	p. 6
Aussat's New Transportables	p. 6
Satellite Radio Paging in Australia	p. 7
Kampuchea's Intersputnik Earth Station	p. 7
Pacstar At a Glance	p. 7
North American Ku-band Transponder Loading Report (Part Two)	p. 8



Phased Array At DH Satellite In Wisconsin

The development of this new application of a textbook theory has major implications for those who are trying to receive relatively weak Intelsat satellite signals or pull in domsat signals from fringe locations throughout the world. According to Frank Weeks of DH Satellite, who worked closely with Keith Anderson of Anderson Scientific on the development of the antenna array, Third World satellite entrepeneurs soon will be able to import an array of smaller and cheaper parabolas for reception of certain signals instead of being forced into purchasing a much larger and prohibitively expensive dish.

Since the combined surface square footage of two 13-foot parabolas approaches the same capture area as a single 20-foot dish, or four 16-foot parabolas the equivalent of a 33-foot antenna, the array of smaller dishes can approximate the signal output of a single

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large one. Mr. Weeks said that the spacing of the antennas in the array wasn't especially critical. It was important, however, that the outputs of the LNAs be carefully matched and the signals combined in phase.

This development should be of great benefit to those overseas cable and SMATV operators who are interested in the reception of a single satellite. Since there would be problems in tracking the Clarke Orbit with a multiple antenna array, the application of this innovation to home satellite systems would probably be more limited. Mr. Weeks did mention, however, that in some instances American home dish owners conceivably might use an array of tiny antennas to receive an American domsat from restricted locations.

"But the real beauty of it is that an operator can go on adding additional parabolas to obtain the quality of reception that is desired," Frank told ***World Satellite Update*** in a recent interview. "There seems to be no limitation on the number of antennas that can be combined in this manner."

Two patent applications have already been filed, one by DH Satellite and the other by Anderson Scientific. Two-, four- and eight-parabola arrays and all the essential electronics will be jointly marketed by the two companies under the name MANA/EG for Multiple Antenna Noise Abatement/Extra Gain.

(For further information, contact: DH Satellite, P.O. Box 239, Prairie Du Chein, Wisconsin 53821 Tel: (800) 392-6884 and Anderson Scientific, 2693 Commerce Rd., Rapid City, SD 57702 Tel: (605) 341-3781)

RCA's Satcom Ku-band Satellite Problems Revealed

According to an RCA *Satellite Status and Utilization Report* to the FCC dated March 10, 1987, in-orbit tests have revealed several problems with RCA's Satcom K1 and K2 satellites. On Satcom K2, test signals through transponder 3 in the east spot configuration measured - 20 dBW below nominal values, while the west spot functioned normally. Additionally, the TWTA/DLA (traveling wave tube amplifier/driver limiter amplifier) for Satcom K2 transponder 12 has two distinct problems: the flux control attenuator does not operate and the limiter mode exhibits a contracted dynamic range. The operational impact of this on video transmissions is 3 dB less SN/R with 12 dB attenuation. For SCPC operations, a -2 dB CN/R relative to normal operation with 6 dB attenuation is experienced. To correct the situation, TWTA/DLA #12 has been relegated to spare status while spare TWTA/DLA S4 has been placed in channel # 12. RCA also reported that in July of 1986, transponders 13 and 15 exhibited degraded EIRP performance in the east beam.

The Satcom Ku-band satellites have the ability to transmit by means of east or west 1/2 CONUS or full-CONUS beams. The full-CONUS beam is created by connecting the TWTA to both the east and west output multiplexers to form the combined beam. In the case of transponders 13 and 15 on Satcom K2, the reduction of power levels in the east beam also could affect reception at eastern locations when the CONUS configuration is employed.

Concerning Satcom K1, RCA also reported that in-orbit tests have shown that transponder 14 exhibits reduced gain, varying from 10 to 20 dB below expected performance. Satcom K1 Transponder 2 also failed in the middle of May 1986. The problem eventually was isolated to a malfunction in the tube's power conditioner. Spare TWTA/DLA S2 has been put into transponder 2 and is operating normally. TWTA 4 in transponder 4 shut itself off via the automatic protective circuitry in early June 1986, with symptoms suggesting an outgassing problem and probable eventual recovery. Spare S4 is on line and recovery of TWTA 4 is being attempted on a quarterly basis.

According to Walter Brown, Vice President of Engineering for RCA, each Satcom Ku-band satellite carries 6 spare TWTA/DLAs--or 3 for each polarity set. He also indicated that ground tests were being conducted with the goal of identifying the problem and determining methods to safely dispose of it.

Industry observers believe that unless a way can be found to refurbish the faulty units, RCA could be faced with the possibility that it may not have enough spares to circumvent any future problems which could occur over the lifetime of the satellites. Since the Satcom Ku-band birds are among the first spacecraft in the world to utilize medium-powered (47-watt) TWTAs, there is some concern over whether their longevity will be comparable to the lifetimes achieved by low-power C-band satellite TWTAs.

Dan Sassi, Vice President of Communications at RCA, told us that the company's satellite engineers are working with the spacecraft manufacturer to develop a method for possibly repairing the above mentioned failures with Satcom K1 and K2. Ground simulations of possible technological fixes are now taking place that may provide RCA's satellite experts with the ability to correct one or

more of the problems. These ground simulations must be completed and fully analysed before any attempt is made to actually perform adjustments on the satellites themselves.

RCA's problems with their Ku-band birds have been apparent to industry insiders for the past year and a half. One source indicated that within the first months of operation, customers who had purchased or leased transponders on the bird had been shuffled around to new assignments in an attempt to minimize the impact of the problems. The March 10, 1987 report to FCC was the first official indication on the part of RCA that there are indeed problems with their Ku-band spacecraft.

Telesat Canada To Supply High-Speed Data Link to Hudson's Bay Company

Telesat Canada has signed a contract with the Hudson's Bay Company for a high-speed satellite link between Toronto and Vancouver. The service will be an Anikom 1000 half T-1 (768 kb/s) link connecting the Hudson's Bay Company in Toronto with the company's Vancouver data center, and used to carry integrated voice and data. The contract value of the service, which can be easily migrated up to a full T-1, is $500,000 annually. The Hudson's Bay Company is Telesat's first customer for Anikom 1000, a service introduced last September at the Canadian Business Telecommunications Alliance (CBTA) show in Toronto.

As a standard-priced service, Anikom 1000 provides T-1 capacity (1.544 Mb/s) or half T-1 communications between two or more points. (T-1 refers to the digital transmission speed of 1.544 megabits per second or Mb/s.) The service has the digital flexibility to carry up to 24 standard telephone circuits simultaneously or any other combination of voice, data and image communications up to T-1 capacity.

(For further information, contact: Murray Long, Telesat Canada (613) 746-5920 ext. 2769.)

Satellite Newsflash: Europe, Africa and the Middle East

Satellite Trials of New British Telecom Data Service Begin

Trials of a new satellite business communications service, which can send computer data both ways through small dish aerials on customers' premises, were intiated by British Telecom last month. The service allows users at terminals in many distant locations, in Europe as well as the United Kingdom, to exchange data easily and cheaply by satellite with their company's central computers.

Communications links can be set up quickly, and their continuity maintained when terminals are moved to new locations. Applications to be evaluated during the six months' trial period include the distribution of news and images for information services, internal electronic mail and other interactive corporate data communications.

The on-premises VSAT (very small aperture terminal) earth stations used for the trial use parabolic antennas with diameters of 1.2m (4 feet) and 1.8m (6 feet). Customers taking part in the trials are linking their central computers using British Telecom's *Kilostream* digital private circuits to a central "hub." Any remote site can communicate directly with the hub, or with any other authorized VSAT via the hub.

Serving as the central hub for the network is British Telecom's London Teleport in the heart of London's dockland. Special processing equipment supplied by Comsat Technology Products of the U.S. has been installed at the Teleport. The hub converts the data to the form used by the network for transmission from the Teleport earth terminal to the Intelsat VA F11 satellite at 27.5 degrees west longitude. The satellite then transmits the data back to the VSATs in the field, where the signal is reconverted to its original form and directly connected into the user's local private network.

(For further information, contact: Derek Willson of British Telecom's Press and Broadcast Office Tel: (01) 356-5366.)

Atlantic Ocean Intelsat Spare Takes on New Video Services

During recent weeks, it has been announced that several new video services are about to begin making their appearance on the Intelsat VA F11 satellite stationed at 27.5° west longitude. The spacecraft's Ku-band capacity will be used to beam three new satellite TV services into Europe. A European version of MTV--a joint venture of Viacom International, Mirror Group Newspapers and British Telecom--is scheduled to begin providing services on August 15th of this year. MTV Europe will appear on the vertically-polarized east beam with a center frequency of 11.030 GHz. Anglovision, an international news program service with heavy contributions from the American NBC television network, is scheduled for a June start up.

The new service will also be carried on the vertically polarized east beam, with a center frequency of 11.175 GHz.

The BBC has recently concluded an agreement with the private Danish cable company KTAS that will allow BBC programs to be carried on cable nets in Denmark as well as in several of the surrounding countries. The BBC program distribution is slated to begin later this month. The Danish PTT has already leased a transponder from British Telecom on behalf of KTAS. Reports indicate that the BBC will use the capacity formerly employed by the now defunct Mirrorvision cable service. Operating via Intelsat VA F11's west spot beam, the BBC satellite service will have a center frequency of 11.175 GHz.

On C-band, the European edition of the USIA's Worldnet program is now being distributed via Intelsat VA F11's global beam footprint, which covers all of the Americas, Europe and Africa. The move from 34.5° west longitude to 27.5° west longitude for this service consolidates both Worldnet's European and Latin American services on the same satellite. The European feed will be received by the French DGT, which recently signed a new contract with the USIA to manage Worldnet in Europe. From France, Worldnet is then retransmitted to Eutelsat and Telecom satellites for distribution on the continent. The French DGT also has been contracted to supply Worldnet's African service. The same global beam transponder on Intelsat VA F11 will be used to send Worldnet programming into Africa. The larger antenna size requirements for global beam reception are not an obstacle in Africa, since there are few independent TV stations or cable nets established there that could deliver the service directly to the public as is the case in Europe. The emphasis in Africa will be on interactive programs that link U.S. embassies and consulates abroad with officials in Washington, D.C. According to Worldnet representatives, the French DGT also has the option of providing an Indian Ocean service of Worldnet which is currently in the planning stage.

Satellite TV in Norway

A new satellite-delivered TV service called Norpas is planned for introduction this September via the Intelsat V F2 satellite at 1° west longitude. The new service is being developed by the private Norwegian Television company **Norsk Programservice**. The company already has acquired a channel from the Norwegian Televerket organization. As of September 1st, the group plans on transmitting three feature films a day and as many as 15 new movies each month. The programs will be broadcast in their original language with Norwegian subtitles. The service will be marketed to local Norwegian TV outlets.

New rules governing the reception of satellite TV signals in Norway are slated to become law in July of this year. Written by the Norwegian PTT, the new rules are based on legislation which was passed by Norway's Stortinget or Parliament in June of 1986. Under the new rules, all satellite signals are available for individual reception free of charge. Up to ten homes will be permitted to share a single satellite earth station. Systems consisting of more than ten homes, however, will come under more restrictive cable legislation.

Satellite Newsflash: The Pacific

RTM Closes Earth Station Tender

Radio Televisi Malaysia, the national TV network of Malaysia operating two TV channels nationwide via Palapa B1 and Intelsat V F7 (uplink via PTT, Jabatan Telecom), just closed applications to tender for a TVRO monitoring station. The station will be used to monitor all the satellite TV programs available within the region and will consist of two thirteen-meter and one eleven-meter antennas with cooled LNAs and broadcast-quality receivers. By the April 15th closing date, companies from Japan, France, Canada, and Singapore had submitted bids. The successful bidder will be announced within the next two months.

Palapa B2P Developments

Commissioning testing of Palapa B2P (Indonesia's replacement for the Palapa B2 satellite which failed to achieve geostationary orbit and was subsequently salvaged by NASA) is running slightly behind schedule due to some ground equipment problems. The satellite, however, should become operational by the time that this issue reaches subscribers. Perumtel plans to shift all ASEAN traffic onto the new satellite at 113° east longitude, while Indonesia's domestic telecommunications traffic will remain on the older B1 spacecraft at 108° east longitude. Prior to the launch of Palapa B2P, there were 7 unused transponders on Palapa B1.

With the successful launch of Palapa B2P, there should be a number of new transponders available. Recent reports from the region indicate that one Indonesian company is negotiating with Equitorial Communications for the right to use their line of

VSAT terminals in the region in conjunction with a spare Palapa transponder.

Palapa TV traffic presently consists of four full time TV channels (RTM1 Malaysia, TVRI Indonesia, BBTV Thailand, and Army TV Thailand) plus occasional video users like Malaysia, which uses a transponder on occasion to send video programs to the cities of Sabah and Sarawak in east Malaysia. The other active transponders have been carrying FDM/FM and analog SCPC signals.

With the launch of Palapa B2P, additional ASEAN participation in the Palapa system may occur. The Philippines holds an option for a Palapa transponder for the transmission of their national TV service. The Philippines Domestic Satellite Corporation has not taken up a lease to date due to lack of funds. Additionally, Thailand and Malaysia hold options on single transponders.

Our Asian correspondant also reports that the Palapa B2 satellite that was salvaged by NASA two years ago was recently sold back to Perumtel by a group of Indonesian businessmen who had acquired the option to the satellite. It will be relaunched sometime in the 1990s after Palapa B3 and serve as a bridge between the Palapa B and forthcoming Palapa C series satellites. Reports indicate that the French company Sateil Conseil has the lead on the contract for feasability studies for the Palapa C satellite system.

CNN in Asia

Within the Pacific region, CNN currently is being used by Japan's Asahi TV network and Australia Channel 7. The feed of CNN comes from the Intelsat V F8 satellite and is video multiplexed with NBC news feeds. CNN has set up a joint venture company in Hong Kong with a local "Hong" and applied for a broadcast license for MMDS transmission to local hotels. According to sources in Hong Kong, the license has not been granted yet and may become entangled in the recent decision by the local government to invite prospective licensees for cabling this city-state of 5.5 million people. So far, seven prospective groups have applied for the cable license, including Cable and Wireless--the local Intelsat Signatory and telephone company owner, and the Hutchison Group, which is now the biggest company in Hong Kong. A final decision is not expected for at least a year and probably will represent a compromise between various powerful interests.

CNN hopes to obtain its MMDS approval from the Hong Kong government within the near future. If granted approval, the downlink for CNN in Hong Kong probably will be through Cable and Wireless which recently installed a 13-meter Universal Antenna at their Hong Kong station to complement their two Intelsat Standard A and two Standard B terminals.

In addition to Hong Kong, CNN also plans to export its program fare to Thailand, South Korea, Singapore, and New Zealand. In Thailand, a group located in Bangkok is already airing CNN in hotels using tapes obtained from the Communications Authority of Thailand (CAT) station at Donburi. In New Zealand, CNN has authorized a local company to collect copyright fees for the some two dozen hotels and motels already picking up CNN via the AFRTS signal.

In the Philippines, the local cable company Sining Makulay reportedly has the go ahead to provide CNN through the local PTT Philcomsat. Negotiations for hotel networks in Korea and Singapore are just getting underway.

Arthur C. Clarke Center Plans Seminar

The Arthur C. Clarke Center for Modern Technologies at the University of Moratuwa in Sri Lanka is planning a seminar on a "Proposed Workshop in the Design and Development of Low Cost Antennas" in late June. The workshop is being partially sponsored by the Arthur C. Clarke Foundation and Intelsat. Topics will include: TVRO in the Role of Education, TVRO in the Global Concept, State of the Art of TVRO, Introduction to the Design and Development of TVRO and Introduction to the Design and Development of a Low Cost Antenna.

(For further information, please contact Dr. Weerakoon at the Arthur C. Clarke Center, University of Moratuwa, Katubedda, Sri Lanka.)

Worldnet in Asia

According to sources within the Pacific Ocean region, the first C-band TVRO stations for the USIA's Worldnet service have been installed in Delhi, India and Jakarta, Indonesia. Future installations are already scheduled for Kathmandu (Nepal), Bangkok (Thailand), Bandar Seri Begawan (Brunei), and Hong Kong. Awaiting local approval are Kuala Lumpur (Malaysia) and Singapore. The installations will be done by local or regional companies. The equipment to be installed consists of 4.8 meter Paraclipse antennas, Drake 324E receivers and MSE 65 degree LNBs. So far, only test programs have been transmitted by Worldnet in

the Pacific region, usually on the Intelsat V F5 satellite at 63° east longitude on global full transponder (4135 MHz), although recently one program was preempted due to the Leonard/Hagler fight to Intelsat VA F12 on a global half transponder which provided an insufficient signal for reception by a 4.8 meter antenna.

Aussat Announces New Generation of Australian-made Transportables

Communications from remote mineral exploration sites has been made easier with the recent introduction by Aussat Pty Ltd of an easy-to-use transportable earth station that, from the mud scrapers on the wheel arches to the sophisticated SCPC (single channel per carrier) electronics, is totally manufactured in Australia. According to Aussat, with a minimum of training, field staff can set up and operate the small Aussat-designed earth station within 20 minutes, giving users immediate access to telephone, fax and telex transmissions. When it comes time to move camp, the transportable can be hitched up to a four wheel drive vehicle and towed to the next site.

Aussat has leased the first of these new generation transportable earth stations to Shell Australia and it is being used for communications between a base camp in the Great Sandy Desert south of Halls Creek, WA, and the company's head office in Melbourne. Called an Interface AM2400, the Aussat earth station measures 2.8 m by 2.0 m and stands 3.0 m high with the 2.4 m dish in the operating position. It weighs just over a ton, making it easily towable by a vehicle such as a Toyota Land Cruiser.

Specifically designed for rugged off-road work, the transportable has air bag suspension on the axle and drawbar. Two shock absorbers between the drawbar and baseplate further reduce impact stress. The sensative electronics have been ruggedised and are located in a dust- and water-proof housing which is rubber-mounted on the baseplate.

The transportable was designed by Aussat engineers and constructed by Vicoach and Aussat personnel at the Vicoach plant in Melbourne. The electronics were provided by the Adelaide communications equipment company in codan, while the aluminum dish was manufactured by Andrew Antenna of Melbourne.

(For further information, contact: Leighton Farrell, Public Affairs Manager, Aussat Pty Ltd Tel: (02) 238-7892.)

Radio Paging By Satellite To Debut in Australia

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Page Alert Pty Ltd of Sydney Australia has developed a satellite radio-paging service for organizations with large numbers of isolated field personnel. The company already has been awarded contracts worth about $5 million from South Australian and New South Wales government authorities. Other potential users include railways, police, forestry, public works and emergency services. Called Skypage, the service uses the Aussat satellite system which can beam the usual radio paging service to any specified area of the country. Page Alert's sales projections show the service may be able to reduce the number of imported radio paging units, now about 15,000 a year, by about 75 per cent.

Soviets Aid Construction of Kampuchea's First Satellite Earth Station

Kampuchea's first satellite earth station, built with Soviet assistance, was completed in mid April of this year, according to the official Kampuchean news agency SPK. The station permits telephone and data linkage through the USSR's Intersputnik system between Kampuchea's capital of Phom Penh and Vietnam's capital of Hanoi. Moscow and other capitals are also linked to Phom Penh through Intersputnik. The new station was built under an agreement signed by Moscow and Kampuchea's government in 1982.

Pacific Satellite Inc. Secures Launch Reservation for Satellites to Serve Pacific Ocean Region

PACSTAR, the regional satellite system of Pacific Satellite Inc., intends to serve the nations of the Pacific with highly-concentrated spot beams linking users of video, voice and data communications services including such customers as financial institutions, airlines and broadcasters. On behalf of Pacific Satellite Inc., the Post and Telecommunications Corporation (PTC) of Papua New Guinea has registered the orbital positions of 167° and 175° east longitude with the IFRB. From these orbital positions, the satellites will be in an ideal position to cover the Pacific Ocean region. In exchange for its role as the host country for the regional PACSTAR satellite network, Papua New Guinea will obtain free use of PACSTAR transponders for domestic telecommmunications purposes.

Pacific Satellite Inc. has also signed a letter of intent with ARINC to pursue the inclusion of aeronautical mobile satellite communications capacity on the first Pacstar spacecraft. ARINC, a non profit organization representing the major commercial airlines, is the second customer for commercial capacity on PACSTAR, and anticipates use of a substantial amount of the available capacity on the satellite.

ARINC, through the Aviation Satellite Corporation, plans to use PACSTAR's L-band aeronautical capacity to provide a variety of airborne telecommunications services to the airlines, including enroute passenger telephone service. ARINC has stated that it currently has commitments for more than 1,000 aircraft, including the major Pacific fleets. The expected requirement in the Pacific is approximately one-third of the capacity on the first PACSTAR satellite.

As of early 1987, Pacific Satellite Inc. was in negotiations with several Pacific nations interested in using the PACSTAR system and/or in equity participation. Pacific Satellite Inc. has also been contacted by a variety of potential users, including broadcasters and other major business telecommunications customers.

Pacific Satellite Inc was conducting negotiations with several satellite manufacturers regarding key technical configurations of the Pacstar satellites as this edition of **World Satellite Update** was going to press. If key procurement decisions are made by mid 1987, a late 1989 launch date could be reached. Pacific Satellite Inc. has secured options for Ariane launches in 1989 and 1990 and also reserved a McDonnell Douglas Delta II launch for 1990.

Although the technical details of the PACSTAR satellites have not yet been finalized, Pacific Satellite Inc has indicated that the spacecraft will carry C-, Ku-, and L-band transponders. C-band spot beams covering mainland Asia and Micronesia will deliver beam-edge EIRP levels of 35 and 31 dBW respectively. Additional Ku-band spot beams centered over mainland China (46 dBW nominal), Japan (44 dBW), Hawaii (42 dBW) and the western U.S. (43 dBW) will also be carried on board each spacecraft.

(For further information on the Pacstar system, contact:

Kim Degnan, Director of Business Development, **TRT International Inc.**, 1331 Pennsylvania Avenue N.W., Suite 1100, Washington D.C. 20004 Tel: (202) 879-2311 Telex: 197791 Fax: (202) 296-6892.

Pacific Satellite Inc., P.O. Box 1783, Port Moresby, Papua New Guinea Tel: (675) 214654 Telex: 22220 Fax: G2/G3: 675-522121.)

Ku-band Satellite Transponder Loading Report for ITU Region 2: the Americas (Part Two of Two Parts)

GStar — GTE Spacenet

Satellite	Location	Tr.#	Beam	BW	Polarity/ Frequency	Service/ Description	Subcarrier Frequency
GStar A01	103.0°W	1	50 State†	54 MHz	H-11.730	**SCPC**-15 Channels	
GStar A01	103.0°W	9	CONUS	54 MHz	V-11.744	**SCPC**-7 Channels	
GStar A01	103.0°W	2	CONUS	54 MHz	H-11.791	**SCPC**-28 Channels	
GStar A01	103.0°W	3	50 State†	54 MHz	H-11.852	**SCPC**-14 Channels	
GStar A01	103.0°W	4	CONUS	54 MHz	H-11.913	**Campus Network**	6.8 MHz
GStar A01	103.0°W	12	CONUS or Half-CONUS	54 MHz	V-11.927	**Occasional Video-** News, sports & teleconferencing.	6.2 MHz
GStar A01	103.0°W	5A	CONUS	27 MHz	H-11.950	**National Tele-communications University (NTU)**	5.51 & 6.2 MHz
GStar A01	103.0°W	5B	CONUS	27 MHz	H-11.980	**NTU & AMCEE**	5.51 & 6.2 MHz
GStar A01	103.0°W	6	CONUS	54 MHz	H-12.035	**SCPC**-72 Channels	
GStar A01	103.0°W	14	CONUS	54 MHz	V-12.049	**SCPC**-11 Channels	
GStar A01	103.0°W	7A	CONUS or Half-CONUS	54 MHz	H-12.082	**Occasional Video-** News, sports & teleconferences.	6.2 or 6.8 MHz
GStar A01	103.0°W	15	CONUS or Half-CONUS	54 MHz	V-12.110	**Occasional Video-** News, sports & teleconferences	6.2 or 6.8 MHz
GStar A01	103.0°W	8	CONUS or	54 MHz	H-12.157	**Occasional Video-** News, sports & teleconferences.	6.2 & 6.8 MHz
GStar A02	105.0°W	1	50 State†	54 MHz	H-11.730	**SCPC**-7 Channels	
GStar A02	105.0°W	9	CONUS	54 MHz	V-11.744	**SCPC**-2 Channels	
GStar A02	105.0°W	2	CONUS	54 MHz	H-11.791	**Digital**-1 MHz Bandwidth	
GStar A02	105.0°W	3	50 State†	54 MHz	H-11.852	**Occasional Video-** News and sports news feeds.	6.2 & 6.8 MHz
GStar A02	105.0°W	11	n.a.	54 MHz	V-11.866	**Digital**-35 MHz Bandwidth	
GStar A02	105.0°W	4	CONUS or Half-CONUS	54 MHz	H-11.913	**Occasional Video-** News, sports news feeds.	6.2 & 6.8 MHz
GStar A02	105.0°W	12	CONUS	54 MHz	V-11.927	**Occasional Video-** Encrypted: B-MAC	None

† Combined CONUS/Alaska/Hawaii beam with 40-watt TWTAs; all other transponders have 20-watt TWTAs

Satellite	Location	Tr.#	Beam	BW	Polarity/ Center Frequency	Service/ Description	Audio Subcarrier Frequency
GStar A02	105.0°W	5	CONUS	27 MHz	H-11.960	**Occasional Video-** (CBS) News and sports news feeds.	6.2 & 6.8 Mhz
GStar A02	105.0°W	13	CONUS	27 MHz	V-11.974	**Occasional Video-** Encrypted: B-MAC.	6.2 & 6.8 MHz
GStar A02	105.0°W	6	CONUS	54 MHz	H-12.035	**Occasional Video-** (CBS) News and sports news feeds.	6.2 & 6.8 MHz
GStar A02	105.0°W	14	CONUS	54 MHz	V-12.049	**Occasional Video-** News & sports news feeds.	6.2 & 6.8 MHz
GStar A02	105.0°W	7A	CONUS or Half-CONUS	54 MHz	H-12.082	**CNN Occasional Video-** News, sports & teleconferencing.	6.2 or 6.8 MHz
GStar A02	105.0°W	8	CONUS or Half-CONUS	54 MHz	H-12.157	**Occasional Video-** News, sports & teleconferencing.	6.2 & 6.8 MHz
GStar A02	105.0°W	16	n.a.	54 MHz	V-12.171	**BAF**-Newsfeeds	
Satcom K						**RCA American Communications**	
RCA K2	81.0°W	01	CONUS	Full	H-11.730	**NBC East**	6.2 & 6.8 MHz
RCA K2	81.0°W	04	CONUS	Half	V-11.805	7 SCPC Channels	
RCA K2	81.0°W	05	CONUS	Full	H-11.852	NBC NY SC5	6.2 & 6.8 MHz
RCA K2	81.0°W	6A	CONUS	Half	V-11.852	**TV Direct-** *The Late Show Starring Joan Rivers* Capitol Satellite Services feeds	5.76 MHz L:5.76 & R:6.2 MHz 5.8 MHz
RCA K2	81.0°W	6B	CONUS	Half	V-11.879	**CONUS SNG**	5.76 MHz
RCA K2	81.0°W	07	CONUS	Full	H-11.913	**NBC Skypath NY & NBC A-News**	6.2 & 6.8 MHz
RCA K2	81.0°W	8A	CONUS	Half	V-11.913	**USTV-**Syndicated program feeds, including *Seminars by Satellite* and *NHK TV from Tokyo*	5.76 & 6.2 MHz
RCA K2	81.0°W	8B	CONUS	Half	V-11.940	**USTV-**Syndicated program feeds, including *DH Direct.*	5.76 & 6.2 MHz
RCA K2	81.0°W	09	CONUS	Full	H-11.974	**NBC Skypath NY**	6.2 & 6.8 MHz

Satellite	Location	Tr.#	Beam	BW	Polarity/ Center Frequency	Service/ Description	Audio Subcarrier Frequency
RCA K2	81.0°W	10A	CONUS	Half	V-11.973	**INDX** Newsfeeds & syndicated programs, including *INN USA Tonight.*	6.2 & 6.8 MHz
RCA K2	81.0°W	10B	CONUS	Half	V-12.000	**E. Washington University** Educational programs.	6.8 MHz
RCA K2	81.0°W	11	CONUS	Full	H-12.035	NBC Media Services NBC London	6.2 & 6.8 MHz 6.2 & 6.8 MHz
RCA K2	81.0°W	13	CONUS	Full	H-12.096	NBC T2 Pacific Coast Feed	6.2 & 6.8 MHz
RCA K2	81.0°W	14	CONUS	Full	V-12.110	B-MAC	
RCA K2	81.0°W	15	CONUS	Full	H-12.157	NBC Skypath NY	6.2 & 6.8 MHz
RCA K1	85.0°W	03	CONUS	Full	H-11.778	Home Box Office (West) (Videocipher II Encrypted)	None
RCA K1	85.0°W	08	CONUS	Full	V-11.940	HBO Inc. (Videocipher II Encrypted)	None
RCA K1	85.0°W	13	CONUS	Full	H-12.083	Cinemax (West) (Videocipher II Encrypted)	None
RCA K1	85.0°W	15	CONUS	Full	H-12.144	Festival (Videocipher II Encrypted)	None
SBS			**Satellite Transponder Leasing Corporation (IBM)**				
SBS IV	89.0°W	01	CONUS	43 MHz	H-11.725	**SCPC**-2 Channels (Pilot Network Data Service)	
SBS IV	89.0°W	02	CONUS or Spot	43 MHz	H-11.774	**Occasional Video**-News, sports or teleconferencing feeds.	6.2 & 6.8 MHz
SBS IV	89.0°W	03	CONUS	43 MHz	H-11.823	(Pilot Network Data Service)	
SBS IV	89.0°W	04	CONUS	43 MHz	H-11.872	**Wideband Digital**-43 MHz.	
SBS IV	89.0°W	05	CONUS	43 MHz	H-11.921	**Automobile Satellite Television Network (ASTN)**-Sales, training and motivational TV program for auto dealers.	6.2 & 6.8 MHz
SBS IV	89.0°W	06	CONUS	43 MHz	H-11.970	**SCPC**-17 channels (VSAT Network)	

Satellite	Location	Tr.#	Beam	BW	Center Frequency	Service/ Description	Subcarrier Frequency
SBS IV	89.0°W	07	CONUS	43 MHz	H-12.019	**American Telemedia Network (ATN)**-Shopping Mall TV Service.	6.2 MHz
SBS IV	89.0°W	10	CONUS	43 MHz	H-12.166	**Wideband Digital**-(7 MHz)	
SBS I~II							**MCI**
SBS II	97.0°W	01	CONUS	43 MHz	H-11.725	**Wideband Digital**-(43 MHz)	
SBS II	97.0°W	02	CONUS	43 MHz	H-11.774	**Wideband Digital**-(43 MHz)	
SBS II	97.0°W	03	CONUS	43 MHz	H-11.823	**Wideband Digital**-(43 MHz)	
SBS II	97.0°W	04	CONUS	43 MHz	H-11.872	**Occasional Video**-News, sports, or teleconferencing feeds.	6.2 & 6.8 MHz
SBS II	97.0°W	05	CONUS	43 MHz	H-11.921	**Wideband Digital**-(43 MHz)	
SBS II	97.0°W	06	CONUS	43 MHz	H-11.970	**Wideband Digital**-(43 MHz)	
SBS II	97.0°W	07	CONUS	43 MHz	H-12.019	**Wideband Digital**-(43 MHz)	
SBS II	97.0°W	08	CONUS	43 MHz	H-12.068	**Wideband Digital**-(43 MHz)	
SBS II	97.0°W	09	CONUS	43 MHz	H-12.117	**Wideband Digital**-(43 MHz)	
SBS II	97.0°W	10	CONUS	43 MHz	H-12.166	**Wideband Digital**-(43 MHz)	
SBS I††	99.0°W	05	CONUS	43 MHz	H-11.921	**SCPC**-4 channels.	
SBS I††	99.0°W	07	CONUS	43 MHz	H-12.019	**SCPC**-7 channels.	

†† At press time, MCI had cleared all of its wideband traffic off of the SBS I satellite because the spacecraft was approaching the end of its conventional operational lifetime. SBS I is scheduled to be turned over to the Comsat Corporation by July 1, 1987. Comsat has filed with the FCC for permission to extend the lifetime of SBS I through the use of a proprietary technique known as the Comsat Maneuver.

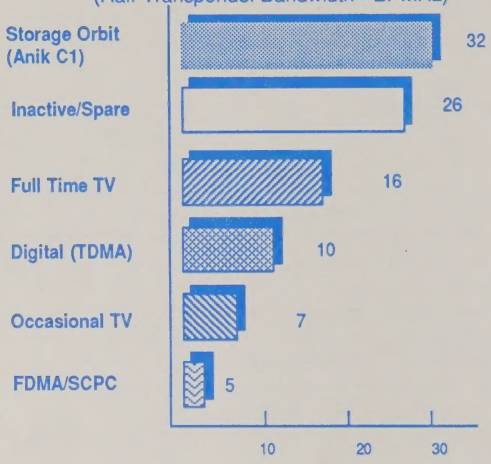
Spacenet							**GTE Spacenet Corporation**
Spacenet II	69.0°W	19	CONUS	72 MHz	H-11.740	SCPC-10 channels	
Spacenet II	69.0°W	20B	CONUS	36 MHz	H-11.830	**FNN**-News and sports news feeds.	5.4 MHz
Spacenet II	69.0°W	21A	CONUS	36 MHz	H-11.880	**Private Satellite Network**-Encrypted: B-MAC	
Spacenet II	69.0°W	21B	CONUS	36 MHz	H-11.920	**Texas Educational Network**-Encrypted: Oak Orion	
Spacenet II	69.0°W	22B	CONUS	36 MHz	H-12.000	**FNN**-News & sports news feeds.	6.8 MHz

Satellite	Location	Tr#	Beam	BW	Polarity/ Frequency	Service/ Description	Subcarrier Frequency
Spacenet II	69.0°W	23	CONUS	72 MHz	H-12.060	Occasional Video- News and sports news feeds.	5.4 MHz
Spacenet II	69.0°W	24	CONUS	72 MHz	H-12.140	Occasional Video- News and sports news feeds.	5.4 MHz

North American Ku-band Satellite Transponder Loading Analysis

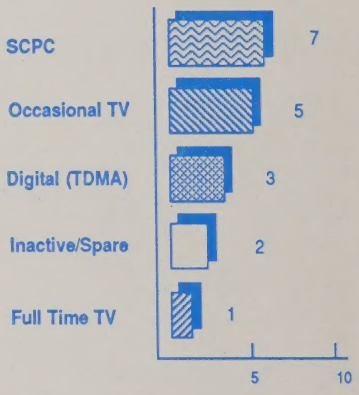
Anik C Utilization

(Half-Transponder Bandwidth = 27 MHz)



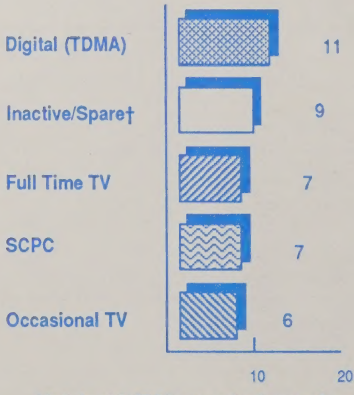
Spacenet/ASC Utilization

(Full-Transponder Bandwidth = 72 MHz)



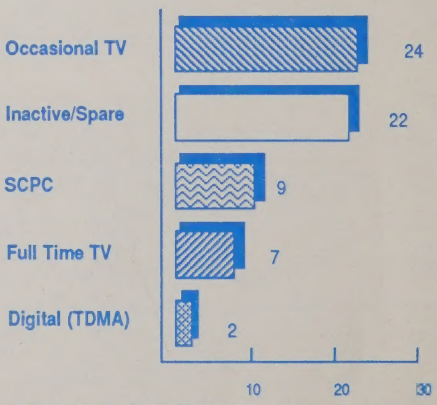
SBS Utilization

(Full-Transponder Bandwidth = 43 MHz)



Satcom/GStar Utilization

(Full-Transponder Bandwidth = 54 MHz)



† Includes eight SBS I transponders that recently were cleared of digital traffic in preparation for handing the satellite over to the new owner Comsat.